flame-retardant, nonmetallic material.

Open conductors: wires that are run as separate conductors, in contrast to wires run through conduit, cables, or raceways.

Portable electric tools: electric equipment intended to be moved from one place to another.

Premises wiring: the interior and exterior wiring, including power, lighting, control, and signal circuit wiring with all of the associated hardware, fittings, and wiring devices, both permanently and temporarily installed, which extend from the load-end of the service lateral conductors to the outlets.

Separately derived system: a premises wiring system whose power is derived from generator, transformer, or converter winding and has no direct electrical connection, including a solidly connected grounded circuit conductor, to supply conductors originating in another system.

Service: the conductors and equipment for delivering energy from the electrical supply system to the wiring system of the premises served.

Voltage: the effective (RMS) potential difference between any two conductors or between a conductor and ground. Voltages are expressed in nominal values. The nominal voltage of a system or circuit is the value assigned to a system or circuit of a given voltage class for convenient designation.

Voltage-to-ground: for grounded circuits, the voltage between the given conductors and that point or conductor of the circuit that is grounded; for ungrounded circuits, the greatest voltage between the given conductor and any other conductor of the circuit.

SECTION 12

CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT)

12.A GENERAL

12.A.01 Before an employee performs any servicing or maintenance on a system where the unexpected energizing, start up, or release of kinetic or stored energy could occur and cause injury or damage, the system shall be isolated in accordance with the requirements of this section: personnel and resources shall not be considered protected until hazardous energy control procedures have been implemented. ***> USACE employees shall comply with ER 385-1-31***

12.A.02 Coordination.

a. All control activities shall be coordinated with and approved by the designated authority.

b. When contractors are planning the use of hazardous energy control procedures they shall submit their hazardous energy control plan to the Corps' designated authority for acceptance. Implementation of hazardous energy control procedures shall not be initiated until the hazardous energy control plan has been accepted by the Corps. ***> See 12.A.07***

c. Corps and contractor designated authorities shall fully coordinate their control activities with one another throughout the planning and implementation of these activities. Each shall inform the other of their energy control procedures, ensure that their own personnel understand and comply with rules and restrictions of the procedures, and ensure that their employees affected by the hazardous energy control activity are notified when the procedural steps outlined in the hazardous energy control plan are to be initiated.

12.A.03 A preparatory inspection with USACE and contractor

personnel shall be conducted to ensure that all affected employees understand the energy hazards and the procedures for their control.

a. When energy control procedures affect both Corps and contractor(s), all Corps and contractor affected employees will participate in the preparatory inspection.

b. The preparatory meeting shall be documented: the time and date of the meeting, the subject matter discussed, and the name of all employees in attendance shall be recorded.

12.A.04 Lockout and tagout shall be performed only by authorized employees.

12.A.05 All employees affected by the lockout or tagout shall be notified, before and upon completion of, the application and removal of lockout or tagout devices.

12.A.06 Lockout and tagout devices.

a. Systems with energy isolating devices which are capable of being locked out shall use locking devices to control hazardous energy unless the designated authority (Corps or contractor) has demonstrated and documented all of the following:

(1) the use of locking devices would entail burdens that exceed any advantage to the use of lockout over the use of tagout devices,
(2) the use of tagout devices will provide full personnel protection (as defined in this section), and
(3) all affected employees can and will be informed that tagout is being used in lieu of lockout.

b. If an energy isolating device is not capable of being locked out, the hazardous energy control procedures shall utilize tagout providing full personnel protection, as follows:

(1) all tagout requirements of this regulation and of the hazardous energy control procedures shall be complied with,
(2) the tagout device shall be attached to the same location, if possible, that the lockout device would have been attached; if this is not possible then the tag shall be attached as close as safely possible to the device and in a position that will be immediately obvious to anyone attempting to operate the device, and
(3) additional means (e.g., placement of the tag in a manner which inhibits operation of the energy isolating device, removal of an isolating circuit mechanism, blocking of a control switch, opening of an extra disconnecting device, removal of a valve handle to reduce the likelihood of inadvertent energization, etc.) shall be employed to provide a level of protection commensurate to that provided by a lockout device.

12.A.07 Hazardous energy control plan.

a. Hazardous energy control procedures shall be developed in a hazardous energy control plan.

b. The plan shall clearly and specifically outline the scope, purpose, authorization, rules, and techniques to be used for the control of hazardous energy, including, but not limited to, the following:

(1) a statement of the intended use of the procedure;
(2) means of coordinating and communicating hazardous energy control activities;
(3) procedural steps and responsibilities for shutting down, isolating, blocking, and securing systems to control hazardous energy;
(4) procedural steps and responsibilities for the placement, removal, and transfer of lockout and tagout devices;
(5) procedural steps and responsibilities for placing and tagging, and moving or removing and untagging, protective grounds;
(6) requirements for testing the system to verify the effectiveness of isolation and lockout and tagout devices;
(7) a description of any emergencies which may occur during

system lockout or tagout and procedures for safely responding to those emergencies;
(8) requirements when authority for removal of hazardous energy control devices must be transferred from the authorized employee to another individual, and the names of the individuals qualified for receiving such transfer; and
(9) the means to enforce compliance with the procedures.

12.B TRAINING

12.B.01 Training shall be provided to ensure that the purpose and function of the hazardous energy control procedures are understood by employees and that employees possess the knowledge and skills required for the safe application, usage, and removal of energy controls.

a. Each authorized employee shall receive training in the recognition of hazardous energy sources, the type and magnitude of energy available in the workplace, and the methods and means for energy isolation and control.

b. Each affected employee shall be instructed in the purpose and use of the energy control procedures.

c. All incidental personnel shall be informed of the procedures and prohibitions relating to restarting or reenergizing systems which are locked or tagged out.

d. When tagout systems are used, employees shall be trained in the limitations of tags.

12.B.02 Employees shall be retrained in hazardous energy control procedures whenever:

a. there is a change in their job assignments, a change in systems or processes that present a new energy control hazard, or a change in energy control procedures, or
b. periodic inspection reveals, or there is reason to suspect the

presence of, inadequacies in or deviations from the employee's knowledge or use of energy control procedures.

12.B.03 The supervisor shall certify and document all training and retraining: certification shall contain such information as the names of employees trained, the time, date, and location of training, the name of the trainer, etc.

12.C PERIODIC INSPECTIONS

12.C.01 Daily inspections shall be conducted to ensure that all requirements of the hazardous energy control procedures are being followed.

12.C.02 Inspections shall be documented and specify the system (location) where the energy control procedures were inspected, the date of the inspection, the names of employees performing and included in the inspections, and any deficiencies in complying with the hazardous energy control procedures.

12.D LOCKOUT AND TAGOUT DEVICES

12.D.01 Lockout and tagout devices shall:

a. be capable of withstanding the environment to which they are exposed for the maximum period of time the exposure is expected, and
b. indicate the identity of the employee applying the device.

12.D.02 Lockout devices shall, in addition to the requirements of 12.D.01, be substantial enough to prevent removal without the use of excessive force or unusual techniques (such as with the use of bolt cutters).

12.D.03 Tagout devices shall, in addition to the requirements of 12.D.01, meet all of the following requirements:

a. have a standardized (within a project) print and format;

b. be constructed and printed so that exposure to weather conditions, wet or damp locations, or corrosive environments will not cause the tag to deteriorate or the message to become illegible;

c. be attached by means which are

(1) nonreusable,

(2) substantial enough to prevent inadvertent or accidental removal,

(3) attachable by hand,

(4) self-locking,

(5) nonreleasable, with a minimum unlocking strength of no less than 23 kg (50 lbs), and

(6) have the basic characteristics of being at least equivalent to a one-piece, all-environment-tolerant nylon cable tie; and

d. warn against the hazardous condition resulting from system energization and include a legend such as "**DO NOT START,**" "**DO NOT OPEN,**" "**DO NOT CLOSE,**" "**DO NOT ENERGIZE,**" "**DO NOT OPERATE**," etc.

12.E APPLYING AND REMOVING LOCKOUT AND TAGOUT DEVICES

12.E.01 The authorized employee shall ensure that all energy isolating devices needed to control energy to, or within, the system are identified and that system is shut down, isolated, blocked, and secured in accordance with the hazardous energy control procedure.

12.E.02 Any system operated by a remotely controlled source will be completely isolated such that it cannot be operated by that or any other source.

12.E.03 The authorized employee shall affix lockout and/or tagout devices to each energy isolating device in accordance with the hazardous energy control procedure.

a. Lockout devices shall be affixed to each energy isolating device in a manner that will maintain the energy isolating device

in the safe position.

b. Tagout devices shall be affixed in such a manner as will clearly indicate that the operation of movement of energy isolating devices from the safe position is prohibited.

12.E.04 In areas not under strict control of personnel involved with the hazardous energy control activities, and in areas with public access, padlocks or other positive controls must be installed on the isolation devices along with the appropriate tags.

12.E.05 Following the application of lockout or tagout devices to energy isolating devices, all potentially hazardous stored or residual energy shall be relieved, disconnected, restrained, discharged, or otherwise rendered safe.

a. Protective grounds shall be identified with safe clearance tags.

b. The authorized employee is responsible for ensuring the control of residual energy and for placing and tagging and removing or moving protective grounds in accordance with the requirements specified in the hazardous energy control procedures.

12.E.06 When there is a possibility of reaccumulation of stored energy to a hazardous level, verification of isolation shall be continued until the energy control procedure is complete.

12.E.07 Before starting work on systems which have been locked out or tagged out, the authorized employee shall verify that isolation and deenergization of the system have successfully been accomplished.

12.E.08 When tagout devices are used, employees shall be instructed in the following requirements and limitations of tags.

a. Tags must be legible and understood by all authorized and

affected employees and incidental personnel.

b. Tags and their means of attachment must be made of materials which will withstand the environments encountered in the workplace.

c. Tags shall be securely attached to energy isolating devices so that they cannot become inadvertently or accidentally detached during use.

d. Tags shall not be removed without authorization of the authorized employee and shall never be bypassed, ignored, or otherwise defeated.

e. Tags are essentially warning devices affixed to energy isolating devices and do not provide the physical protection that is provided by a lock; tags may evoke a false sense of security.

12.E.09 Before lockout or tagout devices are removed and energy restored to the system, the authorized employee shall ensure that following actions have been taken:

a. the work area has been inspected and all nonessential items (e.g., tools and materials) have been removed from the system, the system components are operationally intact, and all employees have been safely positioned or removed from the area; and
b. all affected employees have been notified that the lockout or tagout devices are about to be removed.

12.E.10 With the exception of the following conditions, each lockout and/or tagout device shall be removed from each energy isolating device by the authorized employee who applied the device. When this employee is not available, the device(s) may be removed by another individual appointed by, and under the direction of, the designated authority (Corps or contractor, as appropriate) provided that the following procedures are complied with:

a. the designated authority ensures that the individual appointed to remove lockout and/or tagout devices is knowledgeable of the scope and procedures of the safe clearance;
b. this individual and the requirements for transferring removal authority to him from the authorized individual are listed in the hazardous energy control plan;
c. verification by the designated authority that the authorized employee who applied the device is not at the facility;
d. the designated authority makes all reasonable efforts to contact the authorized employee to inform him that the lockout and/or tagout devices are to be removed; and
e. the authorized employee is informed that the lockout and/or tagout devices have been removed before their resuming work at the facility.

DEFINITIONS

Affected employee: a person whose position requires him to operate or use a system which is under lockout or tagout or whose position requires him to work in an area where a system which is under lockout or tagout is being serviced or maintained.

Authorized employee: a qualified person who is designated, in writing by the designated authority, to request, receive, implement and remove energy control procedures.

Electrical equipment: any device that produces, consumes, stores, transmits, or converts electrical energy.

Electrical line: any conductor used in the transmission of electrical energy from one point to another.

Energy control procedure: the overall written procedure (including responsibilities, procedural steps for lockout and tagout, and requirements for testing the effectiveness of energy control measures) to be used for the control of hazardous energy.

Energy isolation device: a physical device that prevents the transmission or release of energy. Includes, but is not limited to, manually operated circuit breakers, disconnect switches, slide gates, slip blinds, line valves, blocks, or similar devices, capable of blocking or isolating energy, with a position indicator. The term does not include push buttons, selector switches, and other control circuit type devices.

Energy source: includes electrical, mechanical, hydraulic, pneumatic, chemical, thermal, nuclear, stored, or other energy.

Full personnel protection: when a tagout device is used in place of a lockout device, full personnel protection is provided when (1) the tagout device is attached at the same location as the lockout device would have been attached, (2) all tagout-related requirements of this Section have been complied with, and (3) additional means have been taken to provide a level of safety commensurate with that of a lockout device. Such additional means include the removal of an isolating circuit element, blocking of a control switch, opening and tagging an extra (separated by distance) disconnecting device, or the removal of a valve handle to reduce the likelihood of energization.

Hazardous energy control plan: the written plan which clearly and specifically identifies the hazardous energy sources and outlines the scope, purpose, responsibilities, and procedural steps for lockout and tagout and the requirements for testing the effectiveness of energy control measures to be used for the control of hazardous energy from stated sources.

Incidental employee: an employee who, under normal circumstances, would not be in an area where a system is under lockout and tagout but is required to enter or pass through such an area.

Isolation: an activity which physically prevents the transmission or release of energy.

Lockout: a form of hazardous energy control utilizing the placement of a lockout device, in accordance with established procedures, on an energy isolating device to ensure that the energy isolating device and the system being controlled cannot be operated until the lockout device is removed.

Lockout device: a device that uses a positive means, such as a key or combination lock, to hold an energy isolating device in the safe position and prevent the energizing of a system.

Pressure systems: all pipe, tubing, valves, controls, and other devices which operate or are maintained above atmospheric pressure. ***> See definition of vacuum systems***

Stored energy: energy (electrical, mechanical, or chemical) that might be found in a charge capacitor, a loaded spring, chemical solutions, or other similar hazardous form.

System: includes machinery, equipment, and electrical, hydraulic, and pneumatic lines and their subsystems.

Tagout: a form of hazardous energy control procedure utilizing the placement of a tagout device, in accordance with established procedures, on an energy isolating device to indicate that the energy isolating device and the system being controlled may not be operated until the tagout device is removed.

Tagout device: a prominent warning device, such as a tag with a means of attachment, which can be securely attached to an energy isolating device in accordance with established procedures to indicate that the energy isolating device and system being controlled may not be operated until the tagout device is removed.

Vacuum systems: all pipe, tanks, tubing, valves, controls, and other devices which operate or are maintained below atmospheric pressure.